

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrated and not restrictive. The scope of the invention is, therefore, indicated by the appended claims and their combination in whole or in part rather than by the foregoing description. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

1. A semiconductor structure comprising:
an electrically conductive interconnect disposed within a first dielectric layer,
said electrically conductive interconnect having an upper surface;
a first passivation layer disposed upon said upper surface, said first
passivation layer including chemical reaction products and solid solution mixtures
between said electrically conductive interconnect and a chemical compound; and
an ILD disposed upon said first dielectric layer and upon said upper surface,
said ILD being continuously adhered to said upper surface.

2. A semiconductor structure according to claim 1, wherein said electrically
conductive interconnect further comprises:

a first titanium liner layer disposed within a depression in said first dielectric
layer;
a first titanium nitride layer disposed upon said first titanium liner layer; and
a tungsten film disposed upon said first titanium nitride layer and filling said
depression.

3. A semiconductor structure according to claim 1, wherein said first passivation
layer further comprises:

a first tungsten nitride layer disposed upon said upper surface, said first
tungsten nitride layer having a thickness of less than about 50Å.

4. A semiconductor structure according to claim 1, further comprising:
a second passivation layer comprising ammonia and its derivatives that is
adsorbed upon said first passivation layer; and
wherein said first passivation layer comprises a tungsten nitride compound;
and.

5. A semiconductor structure according to claim 1, wherein said first passivation
layer comprises:

a layer upon said upper surface comprising ammonia and its derivatives that
is adsorbed upon said upper surface.

6. A semiconductor structure comprising:
an electrically conductive interconnect disposed within a first dielectric layer,
said electrically conductive interconnect having an upper surface and including:
a first titanium liner layer disposed within a depression in said first
dielectric layer;
a first titanium nitride layer disposed upon said first titanium liner
layer; and
a tungsten film disposed upon said first titanium nitride layer and
filling said depression;
a first passivation layer composed of tungsten nitride layer, disposed upon
said upper surface, and having a thickness of less than about 50Å; and
an ILD disposed upon said first dielectric layer and upon said upper surface,
said ILD being continuously adhered to said upper surface.

7. A semiconductor structure comprising:

an electrically conductive interconnect having an upper surface and being disposed within a dielectric layer, said electrically conductive including:

a titanium liner layer disposed within a depression in said dielectric layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a first passivation layer comprising a tungsten nitride compound and being disposed upon said upper surface;

a second passivation layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer; and

an ILD disposed upon said dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

8. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a dielectric layer, said electrically conductive interconnect having an upper surface and including:

a titanium liner layer disposed within a depression in said dielectric layer:

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a passivation layer disposed upon said upper surface comprising ammonia and its derivatives that is adsorbed upon said upper surface; and

an ILD disposed upon said dielectric layer and upon said upper surface, said ILD being continuously adhered to said upper surface.

9. An interconnect in an electronic device comprising:

a metallic first structure disposed within a first silicon oxide layer, said metallic first structure having an upper surface;

a first passivation layer disposed upon said upper surface, said first passivation layer including chemical reaction products and solid solution mixtures between said metallic first structure and a chemical compound; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

10. An interconnect in an electronic device according to Claim 9, wherein said metallic first structure further comprises:

a first titanium liner layer disposed within an interconnect corridor in said silicon oxide layer;

a first titanium nitride layer disposed upon said first titanium liner layer; and

a tungsten film disposed upon said first titanium nitride layer.

11. An interconnect in an electronic device according to claim 9, wherein said first passivation layer further comprises:

a first tungsten nitride layer disposed upon said upper surface, said first tungsten nitride layer having a thickness of less than about 50Å.

12. An interconnect in an electronic device according to claim 9, further comprising:

a second layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer; and

wherein said first passivation layer comprises:

a first passivation layer is composed of a tungsten nitride compound.

13. An interconnect in an electronic device according to claim 9, wherein said first passivation layer comprises:

a layer upon said upper surface comprising ammonia and its derivatives that is adsorbed upon said upper surface.

14. An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

a titanium liner layer disposed within an interconnect corridor in said silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer;

a passivation layer composed of tungsten nitride layer, having a thickness of less than about 50Å, and being disposed upon said upper surface, said tungsten nitride layer; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

15. An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

a titanium liner layer disposed within an interconnect corridor in said silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer;

a first passivation layer disposed upon said upper surface and composed of a tungsten nitride compound;

a second layer comprising ammonia and its derivatives that is adsorbed upon said first passivation layer; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface

16. An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

a titanium liner layer disposed within an interconnect corridor in said silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer;

a passivation layer disposed upon said upper surface and composed of ammonia and its derivatives that is adsorbed upon said upper surface; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface.

[Handwritten signature]